

Note: John Chavez provided the following to IDEM on March 5, 2003, as a paper he pulled together from the Web regarding mercury in dental operations and how to prevent Hg pollution.

Mercury in Dental Operations

New Fillings

The metal constituents in dental amalgam can be purchased separately and mixed in the appropriate amounts or can be purchased in prepackaged capsules. A tooth is filled by packing the amalgam into the cavity and carving off the excess amalgam before it sets.

There are at least three waste streams that may result from this process:

1. Large amalgam particles that are carved off the cavity - should be collected and recycled.
2. Amalgam particles that enter the wastewater:
 - Some are collected by the filtration system;
 - Because filtration systems are not 100% effective, some are not collected by the filtration system and enter the wastewater discharge from the office.
3. Unused amalgam - should be collected and recycled.

Filling Removal

Removal of old mercury amalgams from teeth also results in mercury waste. As in the new fillings procedure, large amalgam particles that result from the removal process should be collected and recycled. Particles that enter the wastewater may be removed by the filter or may enter the discharge from the office. The municipalities of Metropolitan Seattle and San Francisco have estimated that 23 mg of mercury waste results from each amalgam removal procedure.

Filtration

Most dental facilities have a basic chairside filter (or trap) to capture amalgam particles and many have secondary vacuum filters just upstream of the vacuum pump. In addition, separator technologies are now available that can potentially remove over 90% of the mercury from wastewater.

Estimates of the amount of mercury discharged daily per dentist range from 35 mg (San Francisco) to 300 mg (Duluth).

Other devices in dental offices that may contain mercury include blood pressure devices containing visible liquid mercury, fever thermometers with a silver bulb, and thermostats containing mercury in glass ampoules.

Sources: Water Environment Federation, "Controlling Dental Facility Discharges in Wastewater: How to Develop and Administer a Source Control Program," 1999; Kunkel et. al., "The Fate of Mercury in Dental Amalgam," Water Environment and Technology, December 1996.

Pollution Prevention Opportunities

The pollution prevention goal with regard to mercury in dental offices is to minimize the amount of mercury that enters the environment. Mercury can enter the environment from a dental office by vaporization into office air during mixing of mercury amalgam, and by disposal of mercury amalgam mixing material and old fillings down the drain or in the regular trash.

One way to minimize the amount of mercury that enters the environment is to use non-mercury products in the dental office. Non-mercury restorative fillings and crowns include composite, glass ionomer, gold foil, cast gold alloy and metal-ceramic crowns. Non-mercury blood pressure

devices include aneroid and digital models. Non-mercury alternatives to mercury fever thermometers include digital, indium-gallium-tin and dot matrix thermometers. Non-mercury thermostats include electronic models.

Dentists can implement a mercury pollution prevention program that should include the following:

- commitment to consistent administration of the pollution prevention program
- written policy regarding mercury
- training for staff in proper mercury handling and spill clean up
- product substitution of non-mercury alternatives
- good housekeeping
- mercury inventory control
- recycling

Specific pollution prevention opportunities and best management practices for mercury in dental offices include the following:

- Switch from bulk mercury to precapsulated amalgam. The American Dental Association has recommended eliminating the use of bulk dental amalgam mercury and bulk amalgam alloy in dental offices.
- Limit the amount of amalgam generated to only the amount needed for each restoration.
- Use gauze to retrieve excess amalgam during placement. Larger particles should be stored and recycled.
- Capture amalgam particles in traps and screens before water is discharged to the sewer. Some states recommend disposable, 40 mesh traps.
- Keep mercury and amalgam particles out of the drain and the regular trash.
- Collect and store mercury, amalgam particles and used, disposable traps and filters in properly labeled, airtight containers and send to a mercury recovery facility. Consult your state's hazardous waste regulations for proper labeling and storage.
- Install an amalgam separator.

Sources: Massachusetts Water Resources Authority and Massachusetts Dental Society, "Dentistry and the Environment," January 1988; Water Environment Federation, "Controlling Dental Facility Discharges in Wastewater: How to Develop and Administer a Source Control Program," 1999.